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Shuji Ono

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EXAMINER

KIM, CHONG R

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 08/06/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/934,573

Applicant(s)

ONO, SHUJI

Examiner

Charles Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-22 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-14 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

The following quotation of 37 CFR § 1.75(a) is the basis of objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

1. Claims 1-22 are objected to under 37 CFR § 1.75 (a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery.

Referring to claim 1, the phrase “image capturing for said subject two or more times at least one of said plurality of viewpoints” in lines 9-10 renders the claim ambiguous because it is unclear what is being claimed. It appears that the applicant intended the phrase to read “image capturing for said subject two or more times at the at least one of said plurality of viewpoints”. Appropriate correction is required.

Referring to claim 14, the phrase “capturing at said two viewpoints” in line 5 lacks antecedent basis. It appears that the applicant intended the phrase to read “capturing at two viewpoints”. Appropriate correction is required.

Referring to claim 15, the phrase “one viewpoints” in line 6 is grammatically incorrect. It appears that the applicant intended the phrase to read “one viewpoint”. Similar rejections are applicable to claims 21 and 22. Appropriate corrections are required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 5, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Lu, U.S. Patent No. 5,852,672 (“Lu”).

Referring to claim 1, Lu discloses an image capturing apparatus for obtaining information regarding a depth of a subject, comprising:

- a. a capturing section operable to perform image capturing for the subject at a plurality of viewpoints (col. 5, lines 30-55 and figure 2)
- b. a controller operable to control the capturing section to perform the image capturing at different timings at the plurality of viewpoints (col. 7, lines 12-25 and figure 6)
- c. the controller controls the capturing section to perform the image capturing for the subject two or more times at the at least one of the plurality of viewpoints (figure 6).

Referring to claim 2, Lu further discloses that the capturing section includes a plurality of capturing units respectively provided at a plurality of different positions, and the controller controls the plurality of capturing units to successively perform the image capturing for the subject in such a manner that at least one of the capturing units performs the image capturing two or more times (figures 2 and 6).

Referring to claim 4, Lu further discloses a depth calculating unit operable to calculate a depth of a particular region of the subject based on two or more images obtained by the image capturing performed for the subject two or more times at the one viewpoint and another image obtained by the image capturing performed at another viewpoint different from the one

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viewpoint [col. 7, lines 12-25. Note that the (two or more) time series images (figure 6) are used to obtain time series three-dimensional surfaces (depth) of the subject].

Referring to claim 5, Lu further discloses a positional difference detecting unit operable to detect a positional difference of an image of the particular region of the subject based on the two or more images obtained at the one view point and the other image obtained at the another view point, wherein the depth calculating unit calculates the depth of the particular region of the subject based on the positional difference [col. 6, line 25-col. 7, line 11. Lu explains that the depth information of the subject (z-coordinate) is calculated based on the detected positional difference (camera parameters) of the two or more images obtained at one view point and the other image obtained at the another view point].

Referring to claim 12, Lu further discloses that the capturing section includes the plurality of capturing units at three or more viewpoints which are not aligned on one line (figure 1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 3, 8 10, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu") and Bacs, Jr. et al., U.S. Patent No. 6,324,347 ("Bacs").

Referring to claim 3, Lu does not explicitly disclose a viewpoint moving system operable to move a position at which the capturing section performs the image capturing for the subject to the plurality of viewpoints. However, this feature was exceedingly well known in the art. For example, Bacs discloses a viewpoint moving system operable to move a position at which a capturing section performs image capturing for a subject to a plurality of viewpoints, and a controller for controlling a capturing section to perform image capturing for the subject at a plurality of viewpoints successively by moving the position to the plurality of view points (col. 3, lines 23-40 and figure 1).

Lu and Bacs are combinable because they are both concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing apparatus of Lu to include the viewpoint moving system of Bacs. The suggestion/motivation for doing so would have been to provide an imaging system that is compact in size, light weight, efficient in construction and operation, and convenient to implement in conventional video cameras (Bacs, col. 3, lines 17-22). Therefore, it would have been obvious to combine Lu with Bacs to obtain the invention as specified in claim 3.

Referring to claim 8, Bacs further discloses an image capturing section that includes a light converging unit operable to converge light incident thereon and a light-limiting unit having at least aperture for limiting a range where the light is allowed to pass, and a viewpoint moving

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unit that moves the aperture by moving the light-limiting unit, to realize a plurality of viewpoints (col. 3, lines 23-40 and figure 1).

Referring to claim 10, Bacs further discloses that the viewpoint moving unit is capable of moving the capturing section at three or more viewpoints which are not aligned on one line (col. 6, lines 7-28 and figures 1 and 6).

Referring to claim 11, Bacs further discloses that the viewpoint moving unit is capable of moving the capturing section to a variety of different positions (col. 6, lines 7-28 and figures 1 and 6).

Lu and Bacs do not explicitly disclose that the capturing section is moved to five positions including apices and a center of a diamond. However, the Examiner notes that the specific pattern of the positions where the capturing section is moved to is not considered a patentable distinction because it would have been chosen by the user during experimentation in order to meet his/her requirements. Furthermore, Bacs states that “a variety of configurations ranging from circular to rectangular to complex lissajous patterns” may be implemented (Bacs, col. 4, lines 4-7). Therefore, it would have been obvious to move the capturing section of Lu and Bacs to five positions including apices and a center of a diamond. The suggestion/motivation for doing so would have been to increase the flexibility of the system by providing a variety of different image capturing configurations.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 (“Lu”), Bacs, Jr. et al., U.S. Patent No. 6,324,347 (“Bacs”), and Lo et al., U.S. Patent No. 6,269,223 (“Lo”).

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Lu and Bacs do not explicitly disclose that the capturing section includes a light-limiting unit having a plurality of apertures for limiting a range where light is allowed to pass, and that the viewpoint moving unit closes at least one of the plurality of apertures to realize the plurality of viewpoints.

Lo discloses an image capturing system that includes a light-limiting unit having a plurality of apertures for limiting a range where light is allowed to pass, and a viewpoint moving unit that closes at least one of the plurality of apertures to realize the plurality of viewpoints (col. 2, lines 13-37).

Lu, Bacs, and Lo are combinable because they are all concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image capturing system of Lu and Bacs, so that it includes the features taught by Lo. The suggestion/motivation for doing so would have been to provide a camera that is simple in design and capable of taking both mono and stereo images (Lo, col. 1, line 65-col. 2, line 11). Therefore, it would have been obvious to combine Lu and Bacs with Lo to obtain the invention as specified in claim 9.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu, U.S. Patent No. 5,852,672 ("Lu").

Referring to claim 13, Lu does not explicitly disclose that the capturing section includes the plurality of capturing units at five positions including apices and a center of a diamond. However, the Examiner notes that the specific pattern of the positions of the capturing devices is not considered a patentable distinction because it would have been chosen by the user during



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experimentation in order to meet his/her requirements. Furthermore, Lu explains that a variety of different position patterns for the capturing devices can be implemented (see figure 1 and 2). Therefore, it would have been obvious to set the plurality of capturing units at five positions including apices and a center of a diamond. The suggestion/motivation for doing so would have been to increase the flexibility of the system by providing a variety of position patterns for the image capturing devices.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lu, U.S. Patent No. 5,852,672 ("Lu") and Moreton et al., U.S. Patent No. 5,835,133 ("Moreton").

Referring to claim 14, Lu does not explicitly disclose that the controller controls the capturing section to alternately perform the image capturing at two viewpoints three or more times. However, this feature was exceedingly well known in the art. For example, Moreton discloses a controller that controls a capturing section to alternately perform image capturing at two viewpoints three or more times (col. 8, lines 1-29).

Lu and Moreton are combinable because they are both concerned with stereo imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the controller of Lu so that it controls the capturing section to alternately perform the image capturing at two viewpoints three or more times, as taught by Moreton. The suggestion/motivation for doing so would have been to enhance the imaging process by providing the capability of high resolution image generation (Moreton, col. 8, lines 30-32).

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Therefore, it would have been obvious to combine Lu with Moreton to obtain the invention as specified in claim 14.

### *Allowable Subject Matter*

7. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 15-22 are allowed.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Taima et al. U.S. Patent No. 6,747,610 discloses a stereo imaging system that estimates an image from a set view point by interpolation using peripheral image data.

b. Sato U.S. Patent No. 6,445,815 discloses a stereo imaging system that estimates the viewpoint position at a future point in time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



ck

August 2, 2004



Jon Chang  
Primary Examiner